In the Specification

On page 1, before the first paragraph, please insert the following:

Related Application

This is a continuation of International Application No. PCT/FR02/00051, with an international filing date of January 8, 2002, which is based on French Patent Application No. 01/00218, filed January 9, 2001.

Field of the Invention

On page 1, between the first and second paragraphs, please insert the following heading:

Background

On page 1, please replace the sixth paragraph with the following:

~~The objective of the invention is to propose~~ It would therefore be advantageous to provide an operating table that prevents this user predicament when a collision occurs or risks to occur between an element of the table and a neighboring obstacle especially on the floor, or when there is the risk that two of the table's mobile elements might collide with each other.

On page 2, please replace the first through fourth paragraphs with the following:

Summary of the Invention

~~In order to attain this object, the object of the~~ This invention is an operating table of the previously mentioned type, characterized in that it comprises means for determining a corrective command of a second actuator different from the first actuator upon detecting a risk of collision, the execution of the corrective command order by the second actuator causing the cessation of the detected risk of collision upon subsequent execution of the displacement request of the first actuator, and means to make available to the user this corrective command order.

~~According to particular modes of implementation, the table comprises one or more of the characteristics defined in claims 2 to 8.~~

Brief Description of the Drawings

Better comprehension of the invention will be obtained from the description below presented solely as an example and with reference to the attached drawings in which:

[[- figure]] Fig. 1 is a perspective view of an operating table according to the invention;

[[- figure]] Fig. 2 is a schematic view of the actuation means of the table;

[[- figure]] Fig. 3 is an elevation view of a control unit of the table;

[[- figure]] Fig. 4 is a partial perspective view at an enlarged scale of the translational movement guiding device of the table's platform;

[[- figure]] Fig. 5 is a flow chart explaining an operating routine of the table; and

[[- figures]] Figs. 6A, 6B, 6C, 6D, 6E, 6F and 6G are schematic elevation views of the table illustrating cases of collision of the table's mobile elements with each other or of one of the table's mobile elements with the floor.

Detailed Description

The operating table 10 shown in ~~figure~~ Fig. 1 comprises a base ~~21~~ 12, a pillar or column 14 and a patient-support platform 16. The platform is constituted by an assembly of elements articulated with respect to each other and enabling deformation of the surface on which the patient rests.

On page 3, please replace the second and third paragraphs with the following:

The actuators and sensors are not shown in ~~figure~~ Fig. 1. They are only shown schematically in ~~figure~~ Fig. 2. The installation of the sensors and actuators in the operating table is known by the expert in the field.

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Each actuator can be controlled by two specific buttons provided on a table control unit 18 shown by itself on an enlarged scale in ~~figure~~ Fig. 3.

On page 3, please replace the sixth paragraph with the following:

The platform assembly 16 is mounted so that it can be displaced in a sliding manner in relation to the column 14 along a direction transverse to the axis of the column. For this purpose, guiding and motorization means for the platform in relation to the top of the column are provided. These means are shown in an enlarged scale in ~~figure~~ Fig. 4.

On page 4, please replace the sixth paragraph with the following:

The platform 16 comprises in its center part a baseplate 30 carried by the side rails 26. An actuator 30A is positioned between the baseplate and the top of the column 14 ~~so as~~ to enable control of the tilting of the platform 16 in relation to the axis of ~~this~~ column 14 and around an axis extending generally transversely to the longitudinal axis of the platform 16.

On page 5, please replace the second paragraph with the following:

A position sensor 32B is also associated with the actuator 32A ~~in order~~ to determine the position of the backrest in relation to the baseplate.

On page 5, please replace the fourth and fifth paragraphs with the following:

The baseplate 30 ~~presents~~ has at its end, in the region of connection to the backrest 32, a mobile support or block 34 that can be displaced between a retracted position in the general plane of the baseplate 30 and a deployed position in which it protrudes from the general plane of the baseplate 30.

The block 34 is intended to act on the patient's lower back ~~so as~~ to push it out of the way of the backrest 32.

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On page 5, please replace the eighth paragraph with the following:

Finally, a final actuator is interposed between the platform 16 and the top end of the column 14 to enable [[a]] lateral tilting to the right and left of the baseplate 16 along its longitudinal axis. Thus, the actuator 38A enables the tilting of the platform assembly. This actuator is indicated as 38A and does not respect the notation convention because it constitutes a second actuator acting on the platform 16.

On page 6, please replace the second paragraph with the following:

The table's control circuit is illustrated schematically in figure Fig. 2. It comprises a central data processing unit 50 to which is connected the control unit 18 by a bidirectional data transfer connector.

On page 7, please replace the first paragraph with the following:

In addition to the previously described control buttons, the control unit 18, represented in an enlarged scale in figure Fig. 3, comprises a set of control buttons to lock the operation of the table or to shut off the power to the table.

On page 7, please replace the fifth paragraph with the following:

The means 62 making available the corrective command order comprise, for example, a screen allowing the display of a line of text indicating, especially, the element to be displaced and the direction of displacement of the element so as to stop the potential collision situation.

On page 7, please replace the eighth paragraph with the following:

The message displayed on the screen 62 is sent by the central data processing unit 50 upon implementation of the routine the algorithm of which is illustrated in figure Fig. 5.

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On page 9, please replace the first paragraph with the following:

Examples of such corrective command orders are presented in the description below. The function of these corrective command orders is to stop the risk of collision upon the implementation of the displacement initially requested by the user. Thus, these corrective command orders have the purpose of modifying the table's configuration ~~so as~~ to stop the impossible situation resulting from the nonsatisfaction of the criteria during the test performed in step 72.

On page 9, please replace the fourth through sixth paragraphs with the following:

In other words, the message displaced on the screen 62 allows the user to determine which button of the control unit 18 he should press ~~in order~~ to stop the risk of collision detected in the case of movement of the table according to his initial displacement request.

At the end of step 76, the test performed in step 70 is implemented again ~~in order~~ to enable the user to implement another table displacement request from the control unit 18.

In particular, the user is encouraged to take into account the corrective command order displayed on the screen 62 and to implement this command order by pushing on the corresponding button ~~so as~~ to displace the designated element in the direction indicated in the corrective order.

On page 9, please replace the eighth paragraph with the following:

If, in step 72, the requested displacement is judged to be possible by the data processing unit 50, the corresponding actuator is driven in step 78 from the interface 52. Upon displacement of the actuator, the test executed in step 80 is implemented in <u>a</u> loop ~~so as~~ to ascertain whether the displacement is still possible without risk of collision for the various table elements.

Please replace the paragraph spanning pages 9 and 10 with the following:

As soon as a risk of collision is detected, ~~the stopping of~~ the actuator is commanded <u>to stop</u> in step 82 and steps 73 to 76 are implemented again. In particular, a corrective command order is

displayed on the screen 62 in to provide the user with an indication of a new table displacement request which–after implementation–should enable implementation of the initially requested displacements.

On page 10, please replace the first and second full paragraphs with the following:

When the displacement is possible, the test executed in step 84 ascertains whether the displacement request is still valid, i.e., whether the user still pushes the button corresponding to the control of an actuator. As long as the request is still valid, steps 80 to 84 are implemented in the loop.

When the displacement request is no longer valid, i.e., when the user releases the control button that he was pushing down on, the stopping of the actuator is commanded in step 86, after which the test executed in step 70 is again implemented in the loop until a new table displacement request.

On page 10, please replace the fourth full paragraph with the following:

When such a stopping of the actuator or a refusal to trigger the actuator occurs because of the detection of a risk of collision of one of the table's elements, the user is immediately so informed by an alarm and a corrective command order is made available to him by being displayed on the screen 62, this corrective order being such that when it has been implemented, the initially demanded displacement request can be implemented.

On page 11, please replace the sixth paragraph with the following:

The seventh column presents contains the corrective command order made available to the user by being displayed on the screen 62. The button number on the control unit that must be pressed to apply this corrective command order is shown in parentheses.

On page 14, please replace the first through fifth paragraphs with the following:

In the first case, illustrated in ~~figure~~ Fig. 6A, the table's platform 16 is moved toward the patient's feet to a considerable degree. In this case, the lowering of the backrest 32, by action on the button 32D, is limited or blocked because of the risk that the rear surface of the backrest 32 could hit the end of the rail 20 as shown by the arrow F6A ~~in this figure~~.

Upon stopping the lowering of the backrest, as soon as the conditions indicated in the sixteenth line of the table are satisfied, the corrective command order "displacement of platform toward the head" is displayed on the screen 62. This order causes the user of the table to displace the platform by pushing on the button 16C ~~so as~~ to move the backrest away from the rail 20 and thereby subsequently enable a greater lowering of the backrest.

In the following case also illustrated in ~~figure~~ Fig. 6A, it is assumed that the platform is not completely displaced toward the feet and the backrest is already folded downward to a considerable degree. The command to displace the platform toward the feet causes a risk of the backrest 32 hitting the end of the rail 20. The displacement of the platform toward the feet is interrupted when the conditions indicated in the seventh line of the table are satisfied. Upon the refusal to satisfy the displacement request from the user attempting to further displace the platform toward the feet, the message "raise backrest" appears on the screen 62.

In the case in which the platform 16 is displaced toward the patient's head to a considerable degree, as shown in ~~figure~~ Fig. 6B, the displacement request attempting to lower the legrest 36 is not satisfied until the conditions indicated in the twelfth line of the table are ascertained. As indicated by the arrow F6B, there is a risk of collision between the legrest 36 and the bottom rail 20. When this condition is ascertained, the downward movement of the legrest 36 is blocked and the message "displacement of platform toward the feet" appears on the screen 62.

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Similarly, as illustrated in ~~figure~~ Fig. 6B, when the legrest 36 is lowered to a considerable degree, the request for displacement of the platform 16 intended to move it toward the head is blocked or interrupted when the conditions indicated in the fourth line of the table are satisfied because there is a risk of collision between the legrest 36 and the bottom rail 20. Upon stopping the displacement of the platform 16, the message "raise legrest" is displayed.

On page 15, please replace the first through sixth full paragraphs with the following:

When the platform 16 is tilted toward the side of the patient's head to a considerable degree as shown in ~~figure~~ Fig. 6C, the request for descending the backrest 32 is blocked or interrupted to prevent its end fitted with the headrest 33 from hitting the floor as indicated by the arrow F6C. When the conditions indicated in the fifteenth line of the table are satisfied, the downward displacement of the backrest 32 is blocked and the message "tilt platform toward feet" is displayed.

Other conditions of possible collisions between the headrest and the floor, as illustrated in ~~figure~~ Fig. 6C, are presented in table 1 on lines 3, 18 and 25.

As illustrated in ~~figure~~ Fig. 6D, when the platform 16 is tilted toward the feet to a considerable degree, the downward tilting of the legrest 36 is blocked when the conditions indicated on the eleventh line of the table are ascertained and the message "raise column" is displayed because there is a risk of the end of the legrest 36 hitting the floor as indicated by the arrow F6D.

In the same situation illustrated in ~~figure~~ Fig. 6D, when the legrest 36 is folded downward to a considerable degree, the further frontward tilting of the platform toward the feet (forward sloping) is blocked so as to prevent the legrest from hitting the floor as indicated by the arrow F6D. This blocking is implemented when the conditions indicated in the nineteenth line of the table are ascertained and the message "raise column" is displayed.

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The cases of possible collisions such as are illustrated in ~~figure~~ Fig. 6D are specified in the second, ninth and twenty-second lines of the table. The displayed message is shown in the seventh column for each case.

When the legrest 36 is folded downward as illustrated in ~~figure~~ Fig. 6E, the request intending to reduce the height of the column 14 is interrupted when the conditions indicated in the first column of the table are satisfied and the message "raise legrest" is displayed because, as illustrated by the arrow F6E, there is a risk that the end of the legrest could hit the floor.

Please replace the paragraph spanning pages 15 and 16 with the following:

Similarly, in the same situation illustrated in ~~figure~~ Fig. 6E, when the table's platform 16 is already at a relatively low level, the downward displacement of the legrest 36 is limited when the conditions indicated in the tenth line of the table are ascertained ~~so as~~ to prevent the end of the legrest from hitting the floor. When the request for displacement of the legrest cannot be satisfied, the message "raise the column" is displayed.

On page 16, please replace the first and second full paragraphs with the following:

Other cases of potential collisions and the messages then displayed on the screen in a case corresponding to that of ~~figure~~ Fig. 6E are specified in the table on the fifth, eighth, twentieth and twenty-third lines.

As illustrated in ~~figure~~ Fig. 6F, when the legrest 36 is folded to a considerable degree there is a risk that it could hit the column 14 as shown by the arrow F6F.

On page 16, please replace the fifth full paragraph with the following:

Finally, as illustrated in ~~figure~~ Fig. 6G, when the block 34 protrudes in relation to the baseplate 30, the command "raise backrest" must be limited so as to prevent a collision between the backrest and the block as indicated by the arrow F6G.

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On page 16, please replace the seventh full paragraph with the following:

~~Obviously, the~~ <u>The</u> cases of potential collision and the solutions provided appearing in the table above are only examples and other cases of collision are also handled by implementation of the routine presented in ~~figure~~ <u>Fig.</u> 5.